

Application Serial No. 10/734,753 Response to Office Action mailed Sep. 7, 2005

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions and listings of claims in the present application:

1. (Currently amended) A device for analyzing microparticles, comprising:  
  
a chamber comprising an inlet and an outlet for respectively introducing and dispensing a flowing fluid comprising microparticles, the chamber configured to induce a laminar flow of fluid;  
  
a light source adapted to provide incident light through the chamber;  
  
a photometer configured to measure the intensity of light transmitted through individual microparticles; and  
  
an imaging system configured to acquire images of the flowing fluid within the chamber.
2. (Original) The device of claim 1, further comprising additional light sources configured to provide incident light through the chamber at different wavelengths than the light source.
3. (Canceled)
4. (Original) The device of claim 1, wherein the chamber comprises a channel having a width between approximately 10 microns and approximately 1200 microns.
5. (Original) The device of claim 1, further comprising a microprocessor controller with a storage medium comprising program instructions for analyzing the measured light intensities and acquiring images of the flowing fluid.

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6. (Original) The device of claim 5, wherein the storage medium further comprises program instructions for controlling fluid flow through the chamber.
7. (Original) The device of claim 1, wherein the imaging system comprises a magnification lens configured to enlarge the appearance of individual microparticles within the flowing fluid to be equal to or slightly larger than a pixel size of the images produced by the imaging system.
8. (Original) The device of claim 1, further comprising a moveable mirror system configured to reflect the light transmitted through the chamber to the imaging system.
9. (Original) The device of claim 1, wherein the device is configured to operate from battery power.
10. (Currently amended) A microparticle flow sensor system, comprising:
  - a chamber comprising opposing optical view ports;
  - one or more light sources configured to provide incident light through the optical view ports;
  - an imaging system configured to acquire images of a fluid ~~flowing~~ moving at laminar flow within the chamber; and
  - a storage medium comprising program instructions executable using a processor for:
    - identifying and characterizing microparticles within the fluid; and
    - determining a quantity of the microparticles.

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11. (Original) The microparticle flow sensor system of claim 10, further comprising bandpass filters configured to simultaneously collect light intensity data from multiple wavelengths of the incident light.

12. (Original) The microparticle flow sensor system of claim 10, wherein the program instructions for identifying the microparticles within the fluid comprise program instructions for distinguishing different types of microcapsules contained within the fluid.

13. (Original) The microparticle flow sensor system of claim 12, wherein the program instructions for identifying the microparticles within the fluid comprise program instructions for distinguishing the microcapsules from debris microparticles.

14. (Original) The microparticle flow sensor system of claim 10, wherein the program instructions for identifying the microparticles within the fluid comprise program instructions for determining a shape and size of the microparticles.

15. (Original) The microparticle flow sensor system of claim 10, wherein the program instructions for identifying the microparticles within the fluid comprise program instructions for tracking the trajectory of particles within a fluid.

16. (Original) The microparticle flow sensor system of claim 10, wherein the program instructions for identifying the microparticles within the fluid comprise program instructions for comparing measured intensities of light transmitted through the microparticles at different locations within the chamber.

17. (Original) The microparticle flow sensor system of claim 10, wherein the program instructions for identifying the microparticles within the fluid comprise program instructions for matching the measured light intensities with spectral characteristics of known microparticles.

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18. (Original) A method for identifying and tracking microparticles in motion, comprising:

flowing a fluid comprising microparticles in laminar motion through a chamber;

transmitting light through the fluid within the chamber;

measuring the intensities of the light transmitted through the fluid;

imaging the fluid a plurality of times as the microparticles flow through the chamber; and

comparing at least some of the intensities of light between different images of the fluid to detect and characterize the microparticles.

19. (Original) The method of claim 18, wherein the step of transmitting light comprises transmitting a spectrum of light through the fluid.

20. (Original) The method of claim 18, wherein the step of flowing the fluid comprises flowing the fluid at a rate between approximately 0.10 milliliters per minute and approximately 1.0 milliliters per minute.

21. (Original) The method of claim 18, wherein the step of comparing the intensities of light is used to identify and count the microparticles within the fluid.

22. (Original) The method of claim 18, further comprising comparing the different images of the fluid to:

calculate a time of flight of individual microparticles; and

determine trajectories for the individual microparticles.

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23. (Original) The method of claim 18, further comprising calculating sedimentation rates for the particles within the fluid.

24. (Original) The method of claim 18, further comprising calculating buoyancy rates for the particles within the fluid.

25. (Original) A device for analyzing microparticles, comprising:

a laminar-flow chamber comprising an inlet and an outlet for respectively introducing and dispensing a flowing fluid comprising microparticles;

one or more light sources adapted to provide incident light through the chamber;

a photometer configured to measure the intensity of light transmitted through the chamber;

an imaging system configured to acquire images of the flowing fluid within the chamber; and

a storage medium comprising program instructions executable using a processor for:

analyzing the measured light intensities;

acquiring images of the flowing fluid; and

identifying and characterizing the microparticles based upon the measured light intensities and acquired images.

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26. (Original) The device of claim 25, wherein the one or more light sources are adapted to provide light of different wavelengths.

27. (Original) The device of claim 25, further comprising:

a moveable mirror system configured to reflect the light transmitted through the chamber to the imaging system; and

a plurality of bandpass filters interposed between the moveable mirror system and the imaging system, wherein the bandpass filters are configured to simultaneously collect light intensity data from multiple wavelengths of the incident light.

28. (Original) The device of claim 25, further comprising a fluid subsystem configured to clean out the laminar-flow chamber.